Title: Added Value of DWI for Your Clinical Practice: Response to Therapy

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Highlights

Rationale for use of DWI as a biomarker
Use of DWI in preclinical and clinical studies for tumor response assessment
Challenges, pitfalls, and opportunities for DWI for therapy response

Target audience: Radiologists and medical physicists interested in the use of DWI as a biomarker for treatment response

Summary:

Tumor response assessments form the basis of clinical drug trials and have historically relied upon anatomic measurements, such as outlined by RECIST (Response Evaluation Criteria in Solid Tumors). However, many targeted cancer therapies with novel mechanisms of action may prolong patient survival without affecting tumors volumes. Thus, functional imaging increasingly plays a role to assess therapeutic effectiveness.

This presentation will review the potential of magnetic resonance diffusion weighted imaging (DWI) as a non-invasive biomarker for treatment response. The rationale for the use of DWI in assessing tumor response by will be assessed. The evidence from preclinical and clinical studies supporting the use of DWI for assessing response to therapy will be presented along with illustrative case examples. Finally, challenges and pitfalls in the routine use of DWI in clinical practice will be discussed, with an emphasis on reproducibility.

REFERENCES:

Heijmen L, Verstappen MC, Ter Voert EE, et al. Tumor response prediction by diffusion-weighted MR imaging: Ready for clinical use? *Crit Rev Oncol Hematol* 2012; 83: 194-207

Padhani AR, Koh DM. Diffusion-MR imaging for monitoring of treatment response. *Magn Reson Imaging Clin N Am* 2011; 19: 181-209

Thoeny HC, Ross BD. Predicting and monitoring response with diffusion-weighted MRI. *J Magn Reson Imaging* 2010; 32:12-16